

Applicants : Kenneth Schofield, Mark L. Larson and Keith J. Vadas
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Remarks:

The amendments and remarks presented herein are believed to be fully responsive to the Office Action dated August 1, 2008.

Claims 50-52, 56, 58, 61, 67 and 92-109 are pending in the application. Independent claims 50, 99 and 102 have been amended as set forth above. The amendments are fully supported in the specification and drawings as originally filed. No new matter has been added.

CLAIM REJECTIONS

Claims 50, 52, 56, 58, 62 and 67 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, U.S. Patent No. 5,289,321, in view of Fukuhara, U.S. Patent No. 4,653,316, while claim 51 was rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Fukuhara, and in further view of Tuck, U.S. Patent No. 4,772,942. Claims 92-99 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Tuck, while claims 100-109 were rejected under 35 U.S.C. §103(a) as being unpatentable over Secor, in view of Tuck, and in further view of Kishi et al., U.S. Patent No. 5,414,461.

Applicants respectfully traverse the rejections under 35 U.S.C. §103(a). However, and without acquiescing in the rejections in any manner and solely to expedite prosecution and allowance of the claims, Applicants have clarified independent claims 50, 99 and 102 and submit that the present claims are in condition for allowance for at least the reasons set forth below.

Applicants have amended independent claim 50 to clarify that the synthesized image is displayed on a single display screen that is viewable by a driver of the vehicle when the

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driver is normally operating the vehicle. Independent claims 99 and 102 have been amended to clarify that each of the image capture devices has a respective generally rearward field of view.

Rejection of Independent Claim 50

With respect to the rejection of independent claim 50, Applicants submit that the combination of Secor and Fukuhara does not disclose or suggest or render obvious the claimed vision system. The Office Action states that Fukuhara discloses an image processor producing a synthesized image. Applicants submit that the interpretation of Fukuhara set forth in the Office Action is fundamentally flawed.

On page 3 of the Office Action, the Examiner states:

"an image processor producing a synthesized image from the outputs of the image capture devices by at least one of: luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation, or image warping compensation" (Fukuhara: figures 4 and 8; column 4, lines 13-26). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to take the apparatus disclosed by Secor and add the processing taught by Fukuhara in order to obtain an apparatus that provides data more readily.

To the contrary, neither Figures 4 and 8 nor column 4, lines 13-26, of Fukuhara disclose or suggest this. Column 4, lines 13-26 of Fukuhara merely states that "the data read out from respective television cameras are applied to the synthesizing circuit 33, where the data are synthesized in a manner to be described later and then recorded on a VTR 35." Contrary to the assertions in the Office Action, Fukuhara is wholly silent as to any disclosure or suggestion of an image processor that processes outputs of the image capture devices by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image

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warping compensation. Such processing clearly is not described at column 4, lines 13-26 or Figures 4 or 8 of Fukuhara, or for that matter, any where else in Fukuhara.

In stark contrast to the apparatus of Fukuhara, the presently claimed invention of independent claim 50 includes an image processor that produces a synthesized image from the outputs of at least two image capture devices, and displays the synthesized image on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. The image processor processes the outputs by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation. Clearly, the intent of the present invention is to display a single image that is representative of the combined fields of view of the two or more image capture devices and that is viewable by a driver of the vehicle when the driver is normally operating the vehicle.

Applicants submit that Fukuhara does not disclose or suggest such a vision system, but rather discloses a laser beam scanning apparatus for detecting road surface conditions. Fukuhara does not display any images on a display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. To the contrary, the television cameras of Fukuhara catch the locus of a laser beam on the road surface to determine the cross-sectional profile of the road surface. The data regarding the transverse profile are recorded on a VTR and the stored data is converted into binary values in the processor in accordance with a threshold value so that the position of a crack is judged in accordance with data that is less than a threshold value. Fukuhara discloses that the *result of the judgment* is displayed on display means (see column 6, lines 3-23 of Fukuhara). Thus, Applicants submit that nowhere in Fukuhara is there any disclosure or suggestion in Fukuhara that images are captured and displayed to the driver of vehicle, and clearly there is no disclosure or suggestion in Fukuhara that a synthesized *image* is displayed on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle.

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In stark contrast to the systems of Secor and Fukuhara, the presently claimed invention of independent claim 50 provides a vision system having at least two image capture devices with overlapping fields of view, an image processor that produces a synthesized image from the outputs of the at least two image capture devices, and a display screen that displays the synthesized image, with the synthesized image being displayed on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle, and wherein the image processor processes the outputs by at least one technique chosen from luminant blending, chrominant blending, dynamic range extending, pixel group compensation, anti-blooming, multiple exposure, image morphing compensation or image warping compensation. Neither Secor nor Fukuhara discloses or suggests such a system. For example, neither Secor nor Fukuhara discloses a vehicle having at least two image capture devices with overlapping fields of view. Nor does either Secor or Fukuhara disclose or suggest, for example, an image processor that produces a synthesized image from the outputs of at least two image capture devices. Nor is there any disclosure or suggestion in Secor or Fukuhara of, for example, displaying a synthesized image on a single display screen that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. Moreover, Applicants submit that both Secor and Fukuhara teach away from such a vision system.

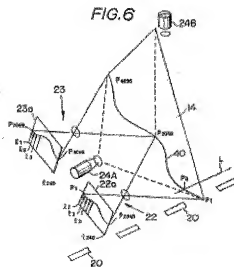
Secor discloses a vehicle having multiple cameras. Contrary to the statement in the Office Action that the side cameras of Secor have an overlapping field of view, Applicants submit that column 4, lines 13-22 of Secor does not teach such a configuration of cameras, but instead teaches that the side cameras are "oriented sideways, that is, in the direction transversed to the traveling direction." Secor further teaches that "this arrangement provides a view to the side of the vehicle, which can be enormously useful when backing out of a narrow parking spot into a busy or dangerous street, or where there are small children in the vicinity." See column 4, lines 15-22 of Secor. Thus, Applicants submit that Secor teaches that the cameras are directed sideways (away

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from one another), and thus teaches away from a vision system having at least two image capture devices with overlapping fields of view.

Likewise, Applicants submit that Fukuhara does not disclose or suggest cameras with overlapping fields of view. To the contrary, Fukuhara clearly discloses that each camera has a field of view that encompasses the scanning loci of the laser beam in the range of specific respective positions for each camera. Thus, Applicants submit that Fukuhara teaches away from a vision system having at least two image capture devices with overlapping fields of view.

As disclosed in Fukuhara, the laser beam scanning apparatus includes two television cameras that are directed at a 60 degree downward angle for catching the locus of the laser beam on the road surface and reflected light. The cameras have non-overlapping fields of view such that the cameras 22, 23 pick up the scanning loci 40 of the laser beam respectively in the range of positions $P_1 - P_{2048}$ and $P_{2049} - P_{4096}$ (see column 3, lines 56-60 and Figure 6 of Fukuhara, reproduced to the right).



Therefore, Applicants respectfully submit that the combination of Secor and Fukuhara does not disclose or suggest or render obvious the vision system of the presently claimed invention, particularly as set forth in independent claim 50 and the claims depending therefrom. Reconsideration and withdrawal of the rejection of claims 50-52, 56, 58, 61 and 67 is respectfully requested.

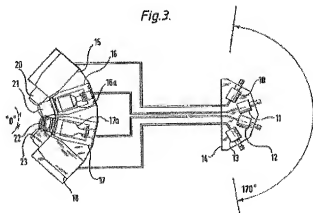
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Rejection of Independent Claim 92

With respect to the rejection of independent claim 92, Applicants submit that the combination of Secor and Tuck does not disclose or suggest or render obvious the claimed vision system. Secor does not disclose, for example, a vision system with a display system displaying a composite image (synthesized from outputs of at least two image capture devices) on a single display screen of the vehicle that is viewable by the driver of the vehicle. To the contrary, Secor discloses a plurality of LCD screens (40, 42, 44), with each screen displaying a view from the respective camera. Thus, Secor teaches away from presently claimed invention of independent claim 92. Further, the Office Action acknowledges that Secor does not disclose a synthesized image and non-parallel axes as claimed, and cites to Tuck for support of the rejection.

Tuck discloses a display system for a tank that includes individual display units mounted side-by-side, each having a respective television camera associated therewith so that a substantially continuous picture of at least part of the surrounding panorama can be reconstructed and viewed by an observer. Sec, for example, the Abstract and Figure 3 of Tuck, reproduced to the right. As can be seen in Figure 3 of Tuck, each camera 10, 11, 12, 13 is associated with a respective display generator 15, 16, 17, 18, which display the respective images to the observer "O" through respective magnifying lenses 20, 21, 22, 23. There is no disclosure or suggestion in Tuck of a display system that displays a composite image synthesized from outputs of the image capture

devices, with the display system displaying the composite image on a *single* display screen of the vehicle. Nor is there any disclosure or suggestion in Tuck of the display system displaying a displayed image on a single display screen that includes an image portion from each of the image capture devices or cameras. Moreover, Applicants submit that Tuck teaches away from such a



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vision system by teaching that each of the individual display units has a respective television camera associated therewith, such that images captured by each television camera are displayed on their associated display unit such that the displayed image on one of the individual display units cannot have an image portion from each of the image capture devices.

Therefore, Applicants respectfully submit that the combination of Secor and Tuck does not disclose or suggest or render obvious the vision system of the presently claimed invention, particularly as set forth in independent claim 92 and the claims depending therefrom. Reconsideration and withdrawal of the rejection of claims 92-98 is respectfully requested.

Rejection of Independent Claim 99

With respect to the rejection of independent claim 99, Applicants submit that the combination of Secor and Tuck does not disclose or suggest or render obvious the claimed vision system for at least the reasons set forth above with respect to the rejection of independent claim 92. Reconsideration and withdrawal of the rejection of independent claim 99 and claims 100 and 101 depending therefrom is respectfully requested.

Rejection of Independent Claim 102

With respect to the rejection of independent claim 102, Applicants submit that the combination of Secor and Tuck and Kishi et al. does not disclose or suggest or render obvious the claimed vision system for at least the reasons set forth above with respect to the rejection of independent claim 92. Reconsideration and withdrawal of the rejection of independent claim 102 and claims 103 and 104 depending therefrom is respectfully requested.

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Rejection of Independent Claim 105

With respect to the rejection of independent claim 105, Applicants submit that the combination of Secor and Tuck and Kishi et al. does not disclose or suggest or render obvious the claimed vision system. As discussed above, neither Secor nor Tuck disclose or suggest, for example, a vision system for a vehicle having a gear actuator and comprising at least two image capture devices positioned on the vehicle and directed rearwardly with respect to the direction of travel of the vehicle, with a display system that displays a composite image synthesized from outputs of the image capture devices, and with the display system displaying the composite image on a single display screen of the vehicle that is viewable by a driver of the vehicle when the driver is normally operating the vehicle. Likewise, Kishi et al. does not disclose or suggest such a vision system. Further, Applicants submit that the combination of Secor and Tuck and Kishi et al. does not disclose or suggest or render obvious such a vision system having, for example, an electronically generated graphic overlay that enhances the driver's understanding of what is in the area adjacent the vehicle, and that is seen superimposed on the displayed composite image, and with the graphic overlay enabled when the vehicle's gear actuator is selected to be in reverse gear. Reconsideration and withdrawal of the rejection of independent claim 105 and claims 106-109 depending therefrom is respectfully requested.

Accordingly, Applicants respectfully submit that Secor and/or Fukuhara and/or Tuck and/or Kishi et al., either alone or in combination with one another or with any other prior art of record, do not disclose, teach, suggest or render obvious the vision system of the present invention, particularly as set forth in independent claims 50, 92, 99, 102 and 105 and in the claims depending therefrom.

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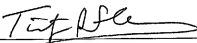
Applicants respectfully submit that claims 50-52, 56, 58, 61, 67 and 92-109 are in condition for allowance and a notice to that effect is earnestly and respectfully requested.

Respectfully submitted,

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